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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,455	10/31/2001	Atsuo Yamada	09792909-5268	7426

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EXAMINER	
DOVE, TRACY MAE	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/003,455	YAMADA ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

P riod f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,9 and 13-15* is/are rejected.

7)☒ Claim(s) *6-8 and 10-12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

The disclosure is objected to because of the following informalities: on page 9, lines 8-11 the specification states "the membrane-electrode assembly constitutes a fuel cell as a whole, to release electric power, thus performing power generation". This is inconsistent with the definition for a membrane-electrode assembly provided on page 14, lines 15-18, the first electrode, the electrolyte membrane, and the second electrode constitute a membrane-electrode assembly "MEA". As is well known in the art and as shown in the figures, a fuel cell at least comprises current collectors and a housing. Thus, the MEA cannot constitute the fuel cell as a whole. Appropriate correction is required.

The specification and claims refer to a fuel cell which can store hydrogen. Note this type of cell is a hybrid cell because it combines battery and fuel cell technologies. The hydrogen storage comes from the nickel-metal hydride battery and the oxygen from the hydrogen-oxygen fuel cell. Thus the term "fuel cell" in the specification and claims is interpreted as a hybrid cell.

Claim Objections

Claim 3 is objected to because of the following informalities: in line 9 "no voltage is not applied" is confusing. Examiner suggests "no voltage is applied". Appropriate correction is required.

Claim 3 is objected to because of the following informalities: in line 15 "in contact oxygen" should recite "in contact with oxygen". Appropriate correction is required.

Claim 13 is objected to because of the following informalities: in line 28 "no voltage is not applied" is confusing. Examiner suggests "no voltage is applied". Appropriate correction is required.

Claim 13 is objected to because of the following informalities: in line 34 "in contact oxygen" should recite "in contact with oxygen". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites "said membrane-electrode assembly constitutes a fuel cell as a whole, to release electric power, thus performing power generation". This is inconsistent with the definition for a membrane-electrode assembly provided on page 14, lines 15-18, the first electrode, the electrolyte membrane, and the second electrode constitute a membrane-electrode assembly "MEA". As is well known in the art and as shown in the figures, a fuel cell at least comprises current collectors and a housing. Thus, it appears the MEA cannot constitute the fuel cell as a whole. In claim 14, there is no antecedent basis for "said fuel electrode".

Claim 15 recites "at least one of said membrane-electrode assemblies acts as a gas supply source" and "at least one of the rest of said membrane-electrode assemblies acts as a power

generator", which is unclear and confusing. Since each of the membrane-electrode assemblies (MEAs) are the same (as defined by claim 13), it is unclear how one MEA performs a function that the other MEAs do not.

To the extent the claims are understood in view of the objections and rejections above, note the following prior art rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 9 and 13-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Hinokuma et al., US 6,495,290 B1.

Hinokuma teaches a hydrogen-air cell having a first electrode and a second electrode (fuel cell of instant claims) that employs a proton conductor between the electrodes (Figure 17). The proton conductor mainly contains a fullerene derivative obtained by introducing a number of functional groups so as to be capable of transferring protons between the functional groups of the fullerene derivative (col. 2, lines 55-59). By using a fullerene derivative as the proton conductor between the first and second electrodes the hydrogen-air cell can eliminate the need for a humidifier and the like which are necessary for known fuel cells that require moisture as a migration medium so as to enhance proton conductivity (col. 3, lines 32-39). Figure 17 shows a hydrogen electrode facing an air electrode with the proton conductor held there between. Air

holes 25 in a fuel cell housing 24 are located on the air electrode 22 side of the membrane electrode assembly (anode/proton conductor/cathode). The hydrogen electrode (anode) may be configured as a hydrogen absorption alloy or a hydrogen absorption alloy supported by a carbon material such as a fullerene. Charging (applying voltage) can be performed by making water (second electrode allowed to be in contact with water) be present on the positive electrode side of the hydrogen-air cell (col. 12, lines 20-49). The proton conductor may be a fullerene or carbon nano-tube structure (col. 14, lines 3-11). The first and second electrodes each contain a catalyst material (col. 10, lines 54-62). Fuel cells are electrochemical cells that can perform power generation (col. 1, lines 26-30).

Thus the claims are anticipated.

Allowable Subject Matter

Claims 6-8 and 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the claims are directed toward a fuel cell (hybrid cell) having an electrolyte comprising a carbonaceous material with dissociative groups introduced into a base body of the carbon material and a hydrogen storage material located at a first electrode. A separation membrane is located between the storing material and the first electrode.

The prior art does not teach the separation membrane of the claimed invention. Hinokuma teaches a hydrogen-air fuel cell comprising a hydrogen storage material located at a

first electrode. Hinokuma does not teach a separation membrane is located between the hydrogen storage material and the first electrode.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Maruyama et al., US 2003/0116443 A1 teaches the claimed invention, however, Maruyama was filed after the instant invention.

Hinokuma et al., US 2003/0013003 A1 teaches a proton conducting electrode for a fuel battery (abstract).

Hitomi, EP 0920065 A1 teaches a water electrolysis cell.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

Tracy Dove
Patent Examiner
Technology Center 1700
Art Unit 1745
January 25, 2004